

shaped cloud was observed. Several persons were injured and damage was done to property to the extent of \$20,000.

At Gansevoort, N. Y., a man was killed by lightning. In the Chemung Valley, in southern New York, the storm was attended by heavy hail, and the loss to crops is estimated at \$250,000. A violent thunder and rain storm visited the vicinity of Somerville, N. J.; many trees were uprooted and a number of barns were struck by lightning. Probably the most severe storm that ever visited Bradford County, Pa., swept over that portion of the state in the afternoon. Two persons were killed and a number injured; many buildings and nearly all the timber in the storm's path were destroyed, and crops were damaged by the heavy hail.

The violent storms in southeastern Louisiana were attended by heavy rain which began on the 6th and continued until the 8th. At Lockport, La., a destructive storm, with a funnel-shaped cloud and other characteristics of a tornado, moved from southeast to northwest at 9.30 a. m., 7th. A heavy roar was heard, the clouds had a whirling motion, and heavy rain fell after the storm. Five persons were killed, 17 injured, and property was destroyed to the estimated value of \$40,000. At Mobile, Ala., a heavy rainstorm prevailed from the morning of the 7th to 6.50 a. m., 8th. The wind attained a maximum velocity of 36 miles per hour; damage was done by heavy rain. At Pensacola, Fla., rain and easterly gales prevailed during the day.

9th.—Heavy rains prevailed in parts of Virginia. At Stanardsville rain began the morning of the 9th and continued for nearly six days. The storm was not so heavy at this place, but 20 miles north, along the Blue Ridge Mountains, the rainfall was exceptionally heavy; 3 children and some stock were drowned, and houses and crops damaged. A severe windstorm passed through Bullock County, Ga., in the morning; considerable damage was done to property. A thunderstorm prevailed at Cairo, Ill., in the evening.

10th.—The most severe thunderstorm of the season passed over Worthington, Ind., in the evening; in the vicinity 2 horses were killed by lightning. At Eureka, Cal., rain began at 8.25 a. m. and continued until 9.37 p. m., 11th; considerable damage was done to grain.

11th.—Heavy rains occurred in parts of North Carolina from the 11th to 13th. Streams overflowed and corn on lowlands was damaged. During a thunderstorm in the northern part of Carroll County, Ky., a barn was struck by lightning. At Cairo, Ill., a thunderstorm occurred in the afternoon; damage was caused to electric wires. During a thunderstorm at Red Bluff, Cal., damage was done to grain.

13th.—A severe thunderstorm, with heavy rain, damaged cotton and corn about Hollands Store, S. C. A heavy hailstorm visited the vicinity of Ada and Long Prairie, Minn.

15th.—Heavy rainstorms occurred in southern New York, a hailstorm in West Virginia, and heavy rain and severe gales prevailed over the Great Lakes. A most disastrous rainstorm visited Broome County, New York, in the morning. Rivers and streams overflowed their banks and considerable damage

was done. The greatest damage occurred at Rossville, a suburb of Binghamton, where 4 houses and a number of barns were destroyed. A fierce gale swept over the Great Lakes on the 15–16th; a number of vessels were wrecked. At Sault Ste. Marie, Mich., the wind attained a maximum velocity of 40 miles per hour on the 16th. At 6.30 a. m., 16th, the Saint Marys River rose higher than ever before, and covered the flood-gate of the canal. At Alpena, Mich., the gale began at 9.15 a. m. and ended at 7.10 p. m., 16th, the wind reaching a maximum velocity of 38 miles per hour. At Middle Island, Lake Huron, a velocity of 55 miles was recorded.

18th.—Heavy thunderstorms prevailed in Minnesota. Five miles southeast of Saint Paul 2 men were killed by lightning.

20th.—During a heavy thunderstorm at Mason City, Iowa, in the afternoon, a man was killed by lightning. A very heavy rainstorm occurred at Fort Stanton, N. Mex., in the afternoon.

21st.—Severe gales prevailed over Lakes Huron and Michigan, and heavy thunder and windstorms in the upper Mississippi valley. At Marquette, Mich., a severe gale began at 6 a. m., the wind attained a maximum velocity of 61 miles per hour at 9.50 a. m., the highest wind velocity on record at this station. A heavy thunder and rain storm occurred at Chicago, Ill., in the evening. At the Columbian Exposition Grounds the wind attained an extreme velocity of 60 miles, and much damage was done. A severe local storm visited Madison, Wis., in the evening. A thunderstorm prevailed at Dubuque, Iowa, in the evening. At Latners, about 12 miles west of Dubuque, the path of the storm was nearly 8 miles long and one-half mile wide. A number of persons were injured. A heavy storm unroofed buildings at Pauline, Kans.

22d.—A severe storm, moving east, passed one mile south of Independence, Kans., injuring one person and destroying several buildings. During a thunderstorm 5 miles west of Omaha, Nebr., a barn was struck by lightning.

23d.—Severe storms were reported in southern Ohio. At Wellston, Ohio, 4 persons were injured, and the estimated damage to property was placed at \$10,000. Near Mason, Ohio, a man was killed by lightning. At Hale City, Tex., a thunderstorm began at 7 p. m.; a house was struck by lightning.

25th.—Damage was caused by heavy hail and wind storms in eastern Virginia. A report from Detroit, Mich., states that during a gale on Lake Erie a schooner was driven ashore on Kellys Island and badly damaged. During a heavy thunderstorm at Benton, Mo., a barn was struck by lightning.

27–28th.—Thunderstorms and heavy rain prevailed in south-central Arizona and New Mexico.

29th.—A heavy thunder and hail storm visited Greenport, N. Y., in the morning; damage was done by hail. A severe southeast gale prevailed over Lake Michigan from noon and continued during the 30th; a number of vessels were wrecked. A heavy thunderstorm, with high wind, occurred at Winnview, Okla.

INLAND NAVIGATION.

FLOODS.

On the 2d the Savannah River continued to rise all day, reaching the height of 24.5 feet. Crops in the lowlands were badly injured. From the 9th to the 18th disastrous rains, the heaviest known in that section in 70 years, were reported in Greene County, Virginia. The loss in crops, houses, fences, and stock was estimated to be \$20,000. The drowning of three children was also reported. From the 11th to the 13th heavy rains in North Carolina caused streams to overflow.

Many acres of corn in the lowlands, especially along the Roanoke and Catawba rivers, were damaged. On the 13th the French Broad River reached the height of 8 feet, the highest ever known at this season of the year. At Holbrook, Ariz., from the 28th to the 30th, the Little Colorado River overflowed its banks, and railroads were washed out.

CLOSING OF NAVIGATION.

On the 27th at Chattanooga, Tenn., navigation for large boats was closed on the Tennessee River. At Shreveport, on

the 30th, the Red River at 6 p. m. was 2.6 feet below zero and 3.6 below the lowest water on record for August.

During the month navigation was closed on the Mississippi River, only one light draft boat running between Shreveport and Coushatta.

STAGE OF WATER IN RIVERS.

The following table shows the danger-points at the various river stations; the highest and lowest stages for the month, with the dates of occurrence; and the monthly ranges:

Heights of rivers above low-water mark, September, 1898.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Shreveport, La.	29.2	1.9	1	—2.5	1, 27-30	4.4
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	10.8	27	—0.2	20-23	11.0
Little Rock, Ark.	23.0	10.5	30	3.3	23	7.2
<i>Missouri River.</i>						
Fort Buford, N. Dak.	25.0	7.0	1	6.3	30	0.7
Bismarck, N. Dak.	75.0	2.8	3	2.0	25-30	0.8
Pierre, S. Dak.	13.0	0.0	1	—3.9	29, 30	3.9
Sioux City, Iowa	18.7	7.0	1, 2	5.3	27, 28	1.7
Omaha, Nebr.	18.0	7.0	1, 2	5.4	28, 29	1.6
Kansas City, Mo.	21.0	7.8	1	5.5	28	2.3
<i>Mississippi River.</i>						
Saint Paul, Minn.	14.0	3.1	19, 20	2.7	8, 9	0.4
La Crosse, Wis.	10.0	2.4	10, 11	1.8	2, 3	0.6
Dubuque, Iowa	16.0	2.2	12-14	1.6	2-5	0.6
Davenport, Iowa	15.0	1.0	{ 12-19, 22-24, 30 }	0.8	{ 1-9, 27-29 }	0.2

Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Mississippi River—Continued.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Keokuk, Iowa.	14.0	0.8	1, 23, 24	0.3	9-12	0.5
Hannibal, Mo.	17.0	1.4	1	1.0	10-12	0.4
Saint Louis, Mo.	30.0	5.2	2	3.4	21, 22	1.8
Cairo, Ill.	40.0	8.3	21	4.7	5	3.6
Memphis, Tenn.	33.0	4.9	24	2.6	7, 8	2.3
Vicksburg, Miss.	41.0	5.2	1, 2	1.2	11, 12	4.0
New Orleans, La.	13.0	4.4	5	2.9	13	1.5
<i>Ohio River.</i>						
Parkersburg, W. Va.	38.0	6.0	4	0.7	23, 24	5.3
Cincinnati, Ohio	45.0	10.3	8	3.8	1	6.5
Louisville, Ky.	24.0	5.6	9	2.2	1	3.4
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	2.6	14, 15	0.6	8-11, 23	2.0
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33.0	12.7	15	2.4	29	10.3
Knoxville, Tenn.	29.0					
<i>Monongahela River.</i>						
Pittsburg, Pa.	22.0	7.2	1	5.4	4	1.8
<i>Savannah River.</i>						
Augusta, Ga.	32.6	23.0	2	6.8	9, 26, 30	16.2
<i>Willamette River.</i>						
Portland, Oregon	15.0	5.1	1	2.6	19, 20	2.5
<i>Susquehanna River.</i>						
Harrisburg, Pa.	17.0	4.4	19	1.5	10, 11	2.9
<i>Alabama River.</i>						
Montgomery, Ala.	48.0	7.2	14	0.7	29, 30	6.5
<i>James River.</i>						
Lynchburg, Va.	18.0	7.5	13	0.8	30	6.7
<i>Sacramento River.</i>						
Red Bluff, Cal.	22.0	1.8	12	0.8	27-30	1.0
Sacramento, Cal.	25.0	9.8	14	8.2	30	1.6
<i>Des Moines River.</i>						
Des Moines, Iowa	19.0	3.0	1-3	2.8	10-29	0.2

ATMOSPHERIC ELECTRICITY.

THUNDERSTORMS.

Description of the more severe thunderstorms reported for the month is given under "Local storms."

East of the Rocky Mountains thunderstorms were reported as follows: In the greatest number of states, 20, on the 15th and 16th; in 15 to 19 on the 6th, 7th, 10th, 11th, 13th, 22d, 24th, and 25th; in 10 to 14 on the 1st, 5th, 8th, 9th, 12th, 18th, 19th, 20th, 21st, 23d, 28th, 29th, and 30th; in 5 to 9 on the 3d, 14th, 17th, 26th, and 27th; and in 4 on the 2d and 4th.

East of the Rocky Mountains thunderstorms were reported on the greatest number of dates, 21, in Florida; on 15 to 19 in Michigan, Missouri, New York, and Texas; on 10 to 14 in Illinois, Indiana, Iowa, Kansas, Minnesota, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia; on 5 to 10 in Alabama, Arkansas, Connecticut, Georgia, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Mississippi, New Jersey, Oklahoma, South Dakota, West Virginia, and Wisconsin; and on 1 to 4 in Delaware, District of Columbia, Indian Territory, New Hampshire, Rhode Island, and Vermont.

West of the Rocky Mountains thunderstorms were reported in Arizona on the 1st, 2d, 19th to 28th; in California on the 1st, 2d, 3d, 5th, 6th, 11th, 12th, and 15th; in Colorado on the 2d, 3d, 4th, 16th, 23d, 27th to 30th; in Idaho on the 6th and 7th; in Montana on the 6th, 7th, 8th, 11th, 12th, and 16th; in Nevada on the 2d to 6th, 11th, 13th to 16th, and 29th; in New Mexico on the 16th, 20th, 24th, 25th, and 27th; in Oregon on the 5th to 9th, 11th, 19th, 20th, and 29th; in Utah on the 5th, 6th, 7th, 11th, 15th, 16th, 23d, 27th to 30th; in Washington on the 5th to 9th, 11th, 16th, 17th, 19th, 20th, 28th, and 29th; in Wyoming on the 3d, 4th, 5th, 11th, 16th, and 29th.

AURORAS.

Auroras were reported as follows: 1st, Sault Ste Marie, Mich.; Saint Vincent, Minn.; Bismarck and Dickinson, N. Dak.; Hayward, Wis. 2d, Sault Ste Marie, Mich. 5th, Sault Ste Marie, Mich.; Saint Vincent, Minn.; Miles City, Mont. 6th, Warren, Minn.; David City, Nebr.; Shawano, Wis. 7th, Julesburg, Colo.; New London, Conn.; Rushville, Ill.; Alta, Iowa; Winthrop, Mass.; Calumet, Sault Ste Marie, and Thornville, Mich.; Fergus Falls and Saint Vincent, Minn.; Lynch, Nebr.; Hightstown, N. J.; Bismarck, Napoleon, and New Salem, N. Dak.; Pierre, Rapid City, and Watertown, S. Dak.; Depere and Shawano, Wis.

8th, Julesburg, Colo.; Greenfield Hill and Storrs, Conn.; Cresco, Iowa; Belfast, Eastport, Gardiner, and Orono, Me.; Boston, Cambridge, Concord, Hadley, Leeds, Royalston, Taunton, and Winthrop, Mass.; Sault Ste. Marie and Thornville, Mich.; Fergus Falls and Warren, Minn.; Miles City, Mont.; Lynch, Nebr.; Bethlehem, Brookline, Nashua, and Sanborn-ton, N. H.; Turin, N. Y.; Ashley, Forman, and Jamestown, N. Dak.; Pierre and Spearfish, S. Dak.; Burlington and Vernon, Vt.; Barron, Wis. 9th, Lewiston, Me.; Cambridge and Hadley, Mass.; Havre and Helena, Mont.; Malone, N. Y.; Dickinson, N. Dak.; Spearfish, S. Dak.

10th, Concord, Mass.; Turin, N. Y.; Vernon, Vt.; Barron, Wis. 11th, Leeds, Mass.; Paterson, N. J. 13th, Eastport, Mayfield, and Orono, Me.; Concord, East Templeton, and Leeds, Mass.; Plymouth, N. H.; Hartland and Vernon, Vt. 14th, Eastport and Mayfield, Me.; Dassel, Farmington, and Saint Olaf, Minn.; Hayward, Wis. 15th, Belfast, Me. 16th, Youngstown, Ohio. 17th, Greenfield Hill, Conn.; Collegeville, Minn.; Baldwinville, N. Y.; Wild Rice, N. Dak.; Youngstown, Ohio. 19th, Somerville, N. J. 22d, Tenafly, N. J.; East Sound, Wash. 26th, Bear Lake, Mich.; Ashley and Fort Stevenson, N. Dak. 27th, Paterson, N. J. 28th, Cambridge, Ind. 29th, Angola, Ind.